When Winners Flip

Compare results within groups and overall.

A1P.DSP.E.36.b "Recognize and explore situations where the association between two categorical variables is reversed when a third variable is considered (Simpson's Paradox)."

NAME _____ DATE _____

REVERSED

One choice has a higher success rate in both groups, but the other choice has a higher rate when the groups are combined.

Rescue teams answer calls in time. Nearby calls: North 9/10, South 80/100. Remote calls: North 2/10, South 1/10. Overall: North 11/20, South 81/110.

STEADY

The same choice has a higher success rate in both groups and when the groups are combined.

Seed packets sprout. Greenhouse: X 8/10, Y 6/10. Porch: X 4/10, Y 2/10. Overall: X 12/20, Y 8/20.

1 SORT

8 items

For each case, circle REVERSED or STEADY; then choose one item from each category and explain your choices using the rates within each group and overall.

1.	Quiz apps, correct answers. Basic: A 9/10, B 32/40. Advanced: A 12/40, B 2/10.	REVERSED STEADY
2.	Delivery routes, on-time trips. Short: A 24/30, B 9/10. Long: A 1/10, B 6/30.	REVERSED STEADY
3.	Solar chargers, successful charges. Sunny: A 9/10, B 7/10. Cloudy: A 4/10, B 2/10.	REVERSED STEADY
4.	Bakery recipes, accepted orders. Small: A 5/5, B 16/20. Large: A 5/20, B 1/5.	REVERSED STEADY
5.	Online courses, finished lessons. Short: A 10/10, B 16/20. Long: A 15/20, B 3/10.	REVERSED STEADY
6.	Goalkeepers, saved shots. Practice: A 6/10, B 9/10. Games: A 3/10, B 7/10.	REVERSED STEADY
7.	Workshop tools, accurate cuts. Simple: A 18/20, B 10/10. Complex: A 1/10, B 4/20.	REVERSED STEADY
8.	School buses, on-time arrivals. Light traffic: A 6/8, B 20/32. Heavy traffic: A 8/32, B 1/8.	REVERSED STEADY

2 PROVE IT

Explain your thinking

Choose one item from each category and explain your choices using the rates within each group and overall.

ITEM # _____ **HOW I KNEW** _____

ITEM # _____ **HOW I KNEW** _____

3 MAKE YOUR OWN

One of each

Write one new REVERSED example and one new STEADY example, showing successes/total for both choices in each group and overall.

REVERSED

STEADY

CHALLENGE

In item 5, add unsuccessful long lessons to A, with no other changes, to make the case REVERSED; give the new number of A's long lessons and both overall rates.

ANSWER KEY # When Winners Flip

HIGH SCHOOL · A1P.DSP.E.36.b

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	Quiz apps, correct answers. Basic: A 9/10, B 32/40. Advanced: A 12/40, B 2/10.	**REVERSED**	A leads in both groups, but overall A is 21/50 and B is 34/50.
2	Delivery routes, on-time trips. Short: A 24/30, B 9/10. Long: A 1/10, B 6/30.	**REVERSED**	B leads in both groups, but overall A is 25/40 and B is 15/40.
3	Solar chargers, successful charges. Sunny: A 9/10, B 7/10. Cloudy: A 4/10, B 2/10.	**STEADY**	A leads in both groups and overall, 13/20 versus 9/20.
4	Bakery recipes, accepted orders. Small: A 5/5, B 16/20. Large: A 5/20, B 1/5.	**REVERSED**	A leads in both groups, but overall A is 10/25 and B is 17/25.
5	Online courses, finished lessons. Short: A 10/10, B 16/20. Long: A 15/20, B 3/10.	**STEADY**	A leads in both groups and overall, 25/30 versus 19/30.
6	Goalkeepers, saved shots. Practice: A 6/10, B 9/10. Games: A 3/10, B 7/10.	**STEADY**	B leads in both groups and overall, 16/20 versus 9/20.
7	Workshop tools, accurate cuts. Simple: A 18/20, B 10/10. Complex: A 1/10, B 4/20.	**REVERSED**	B leads in both groups, but overall A is 19/30 and B is 14/30.
8	School buses, on-time arrivals. Light traffic: A 6/8, B 20/32. Heavy traffic: A 8/32, B 1/8.	**REVERSED**	A leads in both groups, but overall A is 14/40 and B is 21/40.

PART 2 · PROVE IT

Task: Choose one item from each category and explain your choices using the rates within each group and overall. Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 · MAKE YOUR OWN (SAMPLE ANSWERS)

- **REVERSED**: Pet feeders, successful feedings. Dry food: A 4/5, B 12/20. Wet food: A 4/20, B 0/5. Overall: A 8/25, B 12/25. REVERSED.
- **STEADY**: Helmets, passed tests. Low drops: A 7/10, B 5/10. High drops: A 4/10, B 3/10. Overall: A 11/20, B 8/20. STEADY.

Challenge: Add 10 unsuccessful long lessons, making A's long-lesson rate 15/30, still above B's 3/10. Overall, A is 25/40 and B is 19/30, so B leads.

For Part 2, students should compare the choices within both groups, combine successes and totals for each choice, and identify whether the overall leader changes.